

Remediation Status and Compliance Summary

This chapter provides a summary of CERCLA remediation activities in 2001 for each project, and summarizes compliance activities with other applicable environmental laws, regulations, and legal agreements. CERCLA, the “Superfund Act”, is the primary driver for environmental remediation of the FEMP.

The EPA and OEPA enforce the environmental laws, regulations, and legal agreements governing work at the FEMP. The EPA develops, promulgates, and enforces environmental protection regulations and technology-based standards. EPA regional offices and state agencies enforce these regulations and standards by review of data collected at the FEMP. Region V of the EPA has regulatory oversight of the CERCLA process at the FEMP, with active participation from OEPA.

For some programs, such as those under the Resource Conservation and Recovery Act (RCRA), as amended, the Clean Air Act, as amended (excluding NESHAP compliance), and the Clean Water Act, as amended, EPA has authorized the State of Ohio to act as the primary enforcement authority. For these programs, Ohio promulgates state regulations that must be at least as stringent as federal requirements. Several legal agreements between DOE and EPA Region V and/or OEPA identify FEMP specific requirements for compliance with the regulations. As part of complying with these regulations, DOE Headquarters issues directives to its field and area offices and conducts audits to ensure compliance with all regulations.

CERCLA Remediation Status

The process for remediating sites under CERCLA consists of three phases: site characterization, remedy selection, and implementation. The FEMP has completed the first two phases, as the regulatory agencies have approved remedy selection documents (i.e., Records of Decision) for all operable units, as well as several amendments to these documents.

The FEMP is currently involved in the implementation phase of CERCLA remediation, which includes remedial design, remedial action (construction and implementation of the remedy), certification of soil and groundwater to verify that the remedy was effective, and ultimately, site closure. Remediation activities, documents, and schedules are identified in each operable unit’s remedial design and remedial action work plan. Progress has been made toward certification of soil remediation areas, as the Soil and Disposal Facility Project certified several more areas during 2001, as described later in this chapter under the Soil and Disposal Facility Project section.

Each phase of the CERCLA remediation process requires documentation. The documents produced reflect the input of stakeholders who have helped form the remediation strategy at the FEMP. Many documents that describe specific remediation activities were issued and/or approved in 2001, as mentioned throughout this report. All clean-up related CERCLA documentation, including a copy of the Administrative Record, is available to the public at the Public Environmental Information Center located near the FEMP. A copy of the administrative record is also located at EPA’s Region V office in Chicago, Illinois. The progress made by each remedial project toward CERCLA cleanup is summarized later in this chapter.

CERCLA also requires a five-year review process of remedial actions implemented under the signed Record of Decision for each operable unit. The purpose of a five-year review is to determine whether the selected remedy at a site remains protective of human health and the environment through evaluation of performance of the remedy. The First Five-Year Review Report for the FEMP (DOE 2001a) was approved by the EPA in September of 2001.

Cleanup levels for the FEMP for surface water, sediment, and groundwater were established in the Record of Decision for Remedial Actions at Operable Unit 5 (DOE 1996). These final remediation levels (FRLs) were established for constituents of concern, or those constituents at the FEMP determined, through risk assessment, to present potential risk to human health and/or the environment. Table 2-1 lists FRLs identified for constituents in groundwater, surface water, and sediment; these constituents are all monitored under the IEMP. FRLs represent the maximum allowable residual levels (the maximum concentrations which may remain in the environment following remediation), and these levels drive excavation and cleanup.

On November 30, 2001, the EPA approved an Explanation of Significant Differences to the Operable Unit 5 Record of Decision. This document formally adopts the EPA's Safe Drinking Water Act Maximum Contaminant Level for uranium of 30 µg/L as both the FRL for groundwater remediation and the uranium effluent discharge limit to the Great Miami River.

Benchmark Toxicity Values originated from the Operable Unit 5 Sitewide Ecological Risk Assessment. These concentrations for sediment and surface water are used to determine if a constituent may have a detrimental effect on a particular ecological receptor. For surface water and sediment, ecological receptors include fish and animals that inhabit the surface water body or use surface water as a source of drinking water.

Acceptable levels for constituents of ecological concern were established in the Operable Unit 5 Sitewide Ecological Risk Assessment (Appendix B of the Operable Unit 5 Remedial Investigation Report). The Sitewide Ecological Risk Assessment established benchmark toxicity values (BTVs) for protection of ecological receptors. Through the BTV screening process presented in Appendix C of the Final Sitewide Excavation Plan (DOE 1998), three constituents of ecological concern (barium, cadmium, and silver) were selected to be evaluated in the surface water pathway to be protective of aquatic receptors. Chapter 4 discusses BTVs for surface water.

TABLE 2-1
FINAL REMEDIATION LEVELS
FOR GROUNDWATER, SURFACE WATER, AND SEDIMENT

Constituent	FRL ^a		
	Groundwater	Surface Water	Sediment
General Chemistry	(mg/L)	(mg/L)	(mg/kg)
Cyanide	NA ^b	0.012	NA
Fluoride	4 ^c	2.0	NA
Nitrate ^d	11	2,400	NA
Inorganics	(mg/L)	(mg/L)	(mg/kg)
Antimony	0.0060	0.19	NA
Arsenic	0.050	0.149	94
Barium	2	100	NA
Beryllium	0.0040	0.0012	33
Boron	0.33	NA	NA
Cadmium	0.014	0.0098	71
Chromium VI ^d	0.022	0.010	3,000
Cobalt	0.17	NA	36,000
Copper	1.3	0.012	NA
Lead	0.015 ^c	0.010	NA
Manganese	0.900	1.5	410
Mercury	0.0020	0.00020	NA
Molybdenum	0.10	1.5	NA
Nickel	0.10	0.17	NA
Selenium	0.050	0.0050	NA
Silver	0.050	0.0050	NA
Thallium	NA	NA	88
Vanadium	0.038	3.1	NA
Zinc	0.021	0.11	NA
Radionuclides	(pCi/L)	(pCi/L)	(pCi/g)
Cesium-137	NA	10	7.0
Neptunium-237	1.0	210	32
Lead-210	NA	11	390
Plutonium-238	NA	210	1,200
Plutonium-239/240	NA	200	1,100
Radium-226	20	38	2.9
Radium-228	20	47	4.8
Strontium-90	8.0	41	7,100
Technetium-99	94	150	200,000
Thorium-228	4.0	830	3.2
Thorium-230	15	3500	18,000
Thorium-232	1.2	270	1.6
	(µg/L)	(µg/L)	(mg/kg)
Total Uranium ^e	30 ^f	530	210

TABLE 2-1
(Continued)

Constituent	FRL ^a		
	Groundwater	Surface Water	Sediment
Organics	(µg/L)	(µg/L)	(µg/kg)
Alpha-chlordane	2.0	0.31	NA
Aroclor-1254	0.20	0.20	670
Aroclor-1260	NA	0.20	670
Benzene	5.0	280	NA
Benzo(a)anthracene	NA	1.0	190,000
Benzo(a)pyrene	NA	1.0	19,000
Benzo(b)fluoranthene	NA	NA	190,000
Benzo(k)fluoranthene	NA	NA	1,900,000
Bis(2-chloroisopropyl)ether	5.0	280	NA
Bis(2-ethylhexyl)phthalate	6.0	8.4	5,000,000
Bromodichloromethane	100	240	NA
Bromoform	NA	NA	160,000
Bromomethane	2.1	1300	NA
Carbazole	11	NA	63,000
Carbon disulfide	5.5	NA	NA
Chloroethane	1.0	NA	NA
Chloroform	100	79	NA
Chrysene	NA	NA	19,000,000
Dibenzo(a,h)anthracene	NA	1.0	NA
3-3'-Dichlorobenzidene	NA	7.7	NA
1,1-Dichloroethane	280	NA	NA
1,1-Dichloroethene	7.0	15	NA
1,2-Dichloroethane	5.0	NA	NA
Dieldrin	NA	0.020	NA
Di-n-butylphthalate	NA	6,000	NA
Di-n-octylphthalate	NA	5.0	NA
Methylene chloride	5.0	430	NA
4-Methylphenol	29	2,200	NA
4-Methyl-2-pentanone	NA	NA	2,100,000
4-Nitrophenol	320	7,400,000	NA
N-nitrosodiphenylamine	NA	NA	260,000
Octachlorodibenzo-p-dioxin	0.0001	NA	NA
Phenanthrene	NA	NA	3
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.010	NA	NA
Tetrachloroethene	NA	45	NA
1,1,1-Trichloroethane	NA	1.0	NA
1,1,2-Trichloroethane	NA	230	NA
Trichloroethene	5.0	NA	NA
Vinyl Chloride	2.0	NA	NA

^aFrom Record of Decision for Remedial Actions at Operable Unit 5, Tables 9-4 through 9-6, January 1996

^bNA = not applicable because no FRL was required.

^cThe groundwater FRLs for fluoride and lead were changed from 0.89 mg/L and 0.002 mg/L, respectively, to be consistent with the FRL selection process outlined in the Operable Unit 5 Feasibility Study. The changes were documented in the Operable Unit 5 Record of Decision by change pages.

^dBecause of holding time considerations, nitrate/nitrite is analyzed for nitrate, and total chromium is analyzed for hexavalent chromium. Total chromium and nitrate/nitrite provide a more conservative result.

^eUranium consists of several isotopes (uranium-234, 235, 236, and 238). This report interchangeably uses the terms uranium and total uranium, both defined as the sum of the various isotopic components.

^fThe total uranium groundwater FRL was changed to 30 µg/L in 2001 to reflect the EPA's adopted Safe Drinking Water Act Final Maximum Contamination Level for uranium.

Waste Pits Remedial Action Project

The Waste Pits Remedial Action Project (Operable Unit 1) is responsible for the excavation, drying (as required), loading, and rail transport of the contents of waste pits 1 through 6, the burn pit, and the clearwell to an off-site disposal facility. Sampling and analysis of the waste pit material and the off-site disposal of contaminated soil and debris from other FEMP remedial projects that exceed the waste acceptance criteria (physical, chemical, and radiological standards) for the on-site disposal facility is part of this scope of work. The project is also responsible for collecting wastewater and storm water associated with the Waste Pits Remedial Action Project activities and, as needed, pre-treating and discharging this remediation water to the advanced wastewater treatment facility. In addition, the project is responsible for implementing dust control measures, and for implementing point source emission controls for dryer operations.

The Waste Pits Remedial Action Project involves the pre-treatment (e.g., crushing, sorting, and shredding) of waste pit materials, drying (as necessary), and the loadout of railcars with pit material for shipment to Envirocare of Utah, Inc. During 2001, 19 unit trains left the FEMP carrying approximately 125,000 tons (95,575 metric tons) of material. From the time the first rail shipment left the FEMP in April of 1999 through December 2001, the Waste Pits Remedial Action Project has shipped 51 unit trains carrying approximately 320,000 tons (244,672 metric tons) of material to Envirocare of Utah, Inc. for disposal. At the end of 2001, remediation of Pit 1 was nearly complete, and Pits 2 and 3 were approximately 25 percent and 45 percent complete, respectively.



Soil and Disposal Facility Project

The Soil and Disposal Facility Project, which includes components of both Operable Units 2 and 5, is responsible for soil characterization sampling, excavation of contaminated soil, natural resource restoration, and the construction of on-site disposal facility cells and waste placement into those cells. Of note, the on-site disposal facility's leachate and leak detection monitoring, as well as operation, maintenance and monitoring of the leachate transmission system is the responsibility of the Aquifer Restoration Project.

For purposes of excavating contaminated soil, the FEMP has been divided into 10 main soil remediation areas. Figure 2-1 depicts Remediation Areas 1 through 9. Area 10, which is not shown on Figure 2-1, consists of potentially contaminated corridors such as haul routes, utility corridors and access roads. Area 10 will not be addressed until the end of both soil and aquifer remediation.

Prior to remediation, real-time scanning and soil sampling are performed to support engineering designs to determine the extent of contaminated soil for remediation, and to identify the materials that meet the waste acceptance criteria for the on-site disposal facility. Materials that cannot be placed in the on-site disposal facility are stockpiled, monitored, and tracked for off-site disposal.



The Capping of Cell 1 of the On-Site Disposal Facility

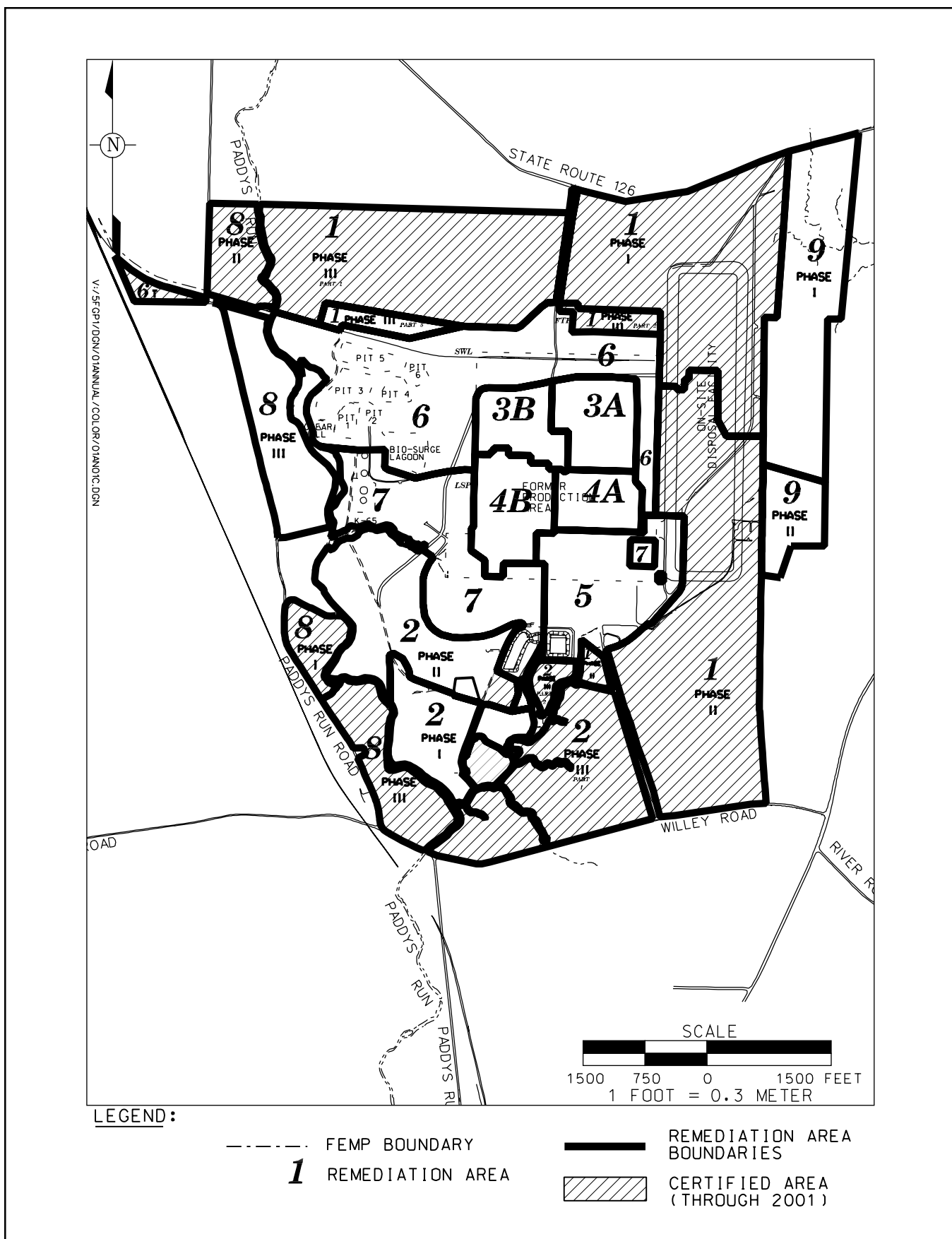


Figure 2-1. Sitewide Soil Remediation Areas and Certified Areas

In 2001 the Soil and Disposal Facility Project continued soil and debris excavations. By the end of 2001, nearly one million yd³ (764,600 m³) of soil had been excavated since remediation began, and the planned soil excavations at the site were approximately 30 percent complete. The following soil remedial excavation activities took place in 2001:

- Area 1, Phase III. Localized areas of construction debris were removed from the southern and western perimeters of this area.
- Area 2, Phase I. Final excavation of the southern waste units was completed.
- Areas 3A/4A. The large-scale excavation of the eastern side of the former production area began in late 2001.

When contaminated soil and debris have been excavated from each area, pre-certification real-time scanning and certification sampling are performed to demonstrate that the residual levels of the constituents of concern for that area are below the site's FRLs. After the laboratory results are reviewed to confirm that constituents of concern are below the site's FRLs, a certification report is submitted to EPA and OEPA, and upon their approval, the area is certified as meeting the soil remediation goal.

During 2001 the following areas of the site were certified:

- Several small areas near the former sewage treatment plant in Area 1, Phase II
- Area 1, Phase III, Parts 1 and 2
- The footprint of the former active flyash pile in Area 2, Phase I
- The Soil Pile 3 footprint just northeast of the southern waste units in Area 2, Phase II.

As of December 31, 2001, slightly more than 50 percent of the FEMP property has been certified. Figure 2-1 identifies the areas that have been certified as of December 31, 2001. After an area is certified, natural resource restoration activities can begin. Chapter 7 discusses the specific natural resource restoration activities that took place in 2001.

At the on-site disposal facility, another important milestone was reached in 2001 with the capping of Cell 1. Also, waste placement into Cells 2 and 3 continued throughout 2001. By year's end, Cell 2 was at 67 percent capacity and Cell 3 was at 27 percent capacity. In addition, construction of the enhanced permanent leachate transmission system was completed in 2001. Chapter 3 discusses the activities associated with the monitoring of the on-site disposal facility.

Decontamination and Demolition Project

The Decontamination and Demolition Project (Operable Unit 3) is responsible for decontamination and dismantling of the above-grade portion of structures and facilities associated with production operations and remedial action facilities. This includes decontamination of facilities, isolation of utilities, demolition of buildings, equipment, and other facilities, and removing uranium and other material from former processing equipment and shipping material and equipment off site. The scope includes the collection and proper management of associated decontamination wastewater. In October 2001, MACTEC Inc., was awarded the demolition closure contract, and will be responsible for all remaining above-grade demolition of structures at the FEMP.

During 2001 decontamination and dismantlement activities were completed at the following facilities:

- 3B Ozone Building
- 3C NAR Control House
- 5A Metals Production Plant
- 5D West Derby Breakout
- 6A Metals Fabrication Plant
- 6G Plant 6 Sump Building
- 8D Plant 8 Railroad Filter Building
- 8E Drum Conveyor Shelter
- 62 Quonset Hut #3.

Demolition of these nine structures brings the total number of structures demolished at the FEMP to 99.



Silos Projects

The Silos Project (Operable Unit 4) includes Silos 1 and 2, also known as the K-65 Silos, Silos 3 and 4, and several nearby structures. Silos 1 and 2 contain low-level radium-bearing residues dating back to the 1950s. Silo 3 contains cold metal oxides, and Silo 4 has never been used. Silos Project remediation activities will include the retrieval, stabilization, and off-site disposal of the residues stored in the silos, as well as decontamination and dismantling of the silo structures and associated facilities.

During 1997 the decision was reached among DOE, EPA, and OEPA to separate the remediation of Silo 3 material from remediation of Silos 1 and 2 material and to re-evaluate the treatment remedies for both materials. In addition, construction of the Silos 1 and 2 Accelerated Waste Retrieval Project was continued. This facility will eventually provide control of radon in Silos 1 and 2 headspace and safe storage of the Silos 1 and 2 material during the interim period until treatment and disposal can be implemented. Following is a summary of each project's major activities during the year.

Silos 1 and 2 Remediation

An Amendment to the Record of Decision for Operable Unit 4 Silos 1 and 2 Remedial Actions was approved by the EPA in July of 2000, thus establishing a revised remedy for treatment of Silos 1 and 2 material. The final revised remedy consists of on-site chemical stabilization of the Silos 1 and 2 material followed by off-site disposal at the Nevada Test Site. Design of the necessary facilities for implementation of the revised remedy for Silos 1 and 2 was initiated in 2001.



The Accelerated Waste Retrieval Facility adjacent to Silos 1 and 2

The Silos 1 and 2 Project initiated the Accelerated Waste Retrieval Project in 1998. The purpose of this project is to address the increasing radon concentrations in the Silos 1 and 2 headspace, as well as issues with silo integrity and heterogeneity of the material for the final treatment facility. The project scope includes design, construction, testing, and operation of interim storage facilities to hold the Silos 1 and 2 material until treatment is implemented. The project also includes design, construction, and startup of a Radon Control System to provide control of radon emissions during construction and operation phases of the Accelerated Waste Retrieval Project, as well as during interim storage and operation of the Silos 1 and 2 full-scale treatment facility. A contract for implementation of the Silos 1 and 2 Accelerated Waste Retrieval Project was awarded to Foster Wheeler Environmental Corporation in 1999. During 2001 a decision was made to transition to a direct-execution approach where Fluor Fernald and its teaming partners would directly execute the remaining design, construction, and operations activities. A Due Diligence review of the Foster Wheeler design was completed and implementation of the resulting design changes was initiated. Construction activities completed during 2001 included erection of the Radon Control System exhaust stack, initial carbon bed installation, and initiation of the erection of the Transfer Tank Area.

Silo 3 Project

A contract for the Silo 3 stabilization/solidification facility was awarded to Rocky Mountain Remediation Services in December 1998. In late 2000, Fluor Fernald's contract with Rocky Mountain Remedial Services was terminated by agreement of both parties. In 2001 evaluation of alternatives for implementation of Silo 3 remediation was initiated and a revised path forward was developed with input from DOE, regulators, and FEMP stakeholders. Design of the necessary facilities was initiated in 2001.

Supplemental Environmental Projects

As a result of missed Operable Unit 4 enforceable milestones in 1996, the dispute resolution agreement with EPA required DOE to perform the following supplemental environmental projects:

- Grants for ecological restoration research
- Creation of a wild bird/wildflower habitat area
- Railroad track recycling
- Structural steel debris recycling.

These supplemental environmental projects are being performed under the scopes of other projects. The wild bird/wildflower habitat area and recycling projects are now complete. Chapter 7 reports the progress on the ecological restoration research in 2001.

Aquifer Restoration and Wastewater Project

The Aquifer Restoration and Wastewater Project (Operable Unit 5) is responsible for the restoration of water quality in the affected portions of the Great Miami Aquifer and treating the FEMP's extracted groundwater, storm water, sanitary wastewater, and remediation wastewater. These activities include the design, construction, operation, monitoring, and reporting for the groundwater restoration and wastewater treatment systems at the FEMP. This project is also responsible for managing the on-site disposal facility's leachate and leak detection monitoring program, as well as operation, maintenance and monitoring of the leachate transmission system.

In 2001 the Aquifer Restoration and Wastewater Project continued to operate the South Plume Module (including the South Plume Optimization Module), the South Field Extraction (Phase I) Module, and the Re-Injection Module. In addition, construction of three new extraction wells began; two in support of the Waste Storage Area Extraction Module, and one in support of the South Field Extraction (Phase I) Module. These wells began operating in early 2002. Also, direct push sampling activities were conducted using the Geoprobe® in the South Field to support the groundwater remedy performance monitoring and design of the South Field Phase II Module.

In 2001 a total of 2,009 million gallons (7,604 million liters) of groundwater were extracted from the Great Miami Aquifer, 867 net pounds (394 kg) of uranium were removed from the aquifer, and 147 million gallons (556 million liters) of water were re-injected into the aquifer. Chapter 3 discusses groundwater monitoring.

Phases 1 and 2 of the advanced wastewater treatment facility and the interim advanced wastewater treatment facility provide final treatment of FEMP contaminated storm water and wastewater. The advanced wastewater treatment facility Phase 3 and the South Plume interim treatment facility are dedicated to treatment of contaminated groundwater associated with FEMP groundwater remediation. In 2001 improvements to the site's wastewater storage, conveyance, and treatment systems included completion of the enhanced permanent leachate transmission system for the on-site disposal facility, and completion of the alternative remedial action subcontractor approach Basin Re-Route Project. This will enable storm water to be routed from the waste pit area to the Storm Water Retention Basin.



Aquifer Restoration and Wastewater Project - Construction of the Enhanced Permanent Leachate Transmission System

Summary of Compliance with Other Requirements

CERCLA requires compliance with other laws and regulations as part of remediation of the FEMP. These other requirements are referred to as applicable or relevant and appropriate requirements, or ARARs. ARARs that are pertinent to remediation of the site are specified in the record of decision for each operable unit. This section highlights some of the major requirements related to environmental monitoring and waste management and how the FEMP complied with these requirements in 2001.

The regulations discussed in this section have been identified as ARARs within the FEMP's records of decision. The FEMP must comply with these regulations while site remediation under CERCLA is underway; EPA and OEPA enforce compliance. Some of these requirements include permits for controlled releases, which are also discussed in this section.

Resource Conservation and Recovery Act (RCRA)

RCRA, as amended, regulates treatment, storage, and disposal of hazardous waste and the hazardous part of mixed waste (mixed waste contains both radioactive and hazardous waste components). Hazardous and mixed waste now generated at the site result from such activities as CERCLA remedial actions, laboratory analyses, and maintenance activities. The FEMP also has an inventory of mixed waste generated from former production activities. These wastes are regulated under RCRA and Ohio hazardous waste management regulations; thus, the site must comply with legal requirements for managing hazardous and mixed wastes. OEPA has been authorized by EPA to enforce its hazardous waste management regulations in lieu of the federal RCRA program. In addition, hazardous waste management is subject to the 1988 Consent Decree and the 1993 Stipulated Amendment entered into between the State of Ohio and DOE, as well as a series of Director's Final Findings and Orders issued by OEPA.

The FEMP completed several administrative activities related to mixed waste storage and treatment during 2001, including:

- Submittal of the 2000 RCRA Annual Report (DOE 2001), which describes hazardous waste activities for 2000
- Revisions to several sections of the RCRA Part A and B permit application
- Submittal of the Fiscal Year 2001 Annual Update to the Site Treatment Plan (DOE 2001d) as required in the 1992 Federal Facility Compliance Act and the implementing Director's Findings and Orders issued by OEPA in October 1995.

Additional details on projects involving treatment of mixed wastes are provided in the Mixed Waste Treatment subsection.

RCRA Property Boundary Groundwater Monitoring

The Director's Findings and Orders, which were signed September 10, 1993, described an alternate groundwater monitoring system. A revision of this document was approved on September 7, 2000, to align with the groundwater monitoring strategy identified in the IEMP. The property boundary groundwater monitoring program is discussed in Chapter 3.

RCRA Closures

The 1993 Stipulated Amendment to Consent Decree required that DOE identify all hazardous waste management units at the site. As a result, burners, incinerators, furnaces, stills, process equipment, tank units, dust collectors, and other potential waste containment units were evaluated in the early 1990s to determine if they were hazardous waste management units or solid waste management units. This evaluation was completed in 1994. In 1996 OEPA issued a Director's Findings and Orders to integrate RCRA closure requirements with CERCLA response actions for FEMP hazardous waste management units. In 2001 the FEMP finalized plans for the remediation of eight units: the Nitric Acid Recovery System, Box Furnace, Oxidation Furnace #1, Plant 8 Warehouse, Uranyl Nitrate Hexahydrate Tanks (three locations), and the storage pad located north of Plant 6.

Thorium Management

A thorium management strategy and a schedule to complete RCRA determinations of thorium materials and to improve the storage of thorium materials at the FEMP were developed as part of the Stipulated Amendment to the Consent Decree signed in 1991. This strategy is based on three primary objectives:

- To maintain environmentally stable interim storage of the thorium inventory while minimizing personnel radiation exposure
- To implement actions required to complete RCRA evaluations of the thorium materials
- To implement long-term storage and disposal alternatives.

The Thorium Overpacking Project, in which the FEMP removed 3,400 containers of thorium material and shipped 10,875 drum-equivalents, or 80,480 ft³ (2,279 m³), of thorium material to the Nevada Test Site for disposal, was completed in 1997. The characterization documentation and formal RCRA waste determinations for the remaining estimated 8,500 containers of thorium legacy waste were continued in 1999. Through the end of 2001, over 6,400 of these containers were shipped to Nevada Test Site for disposal. This shipping effort removed over 1,000,000 pounds (454,000 kg) of thorium from the total site thorium inventory. The following activities are planned for the future:

- Low-level radioactive, non-RCRA thorium legacy waste will continue to be prepared and shipped to the Nevada Test Site for disposal.
- The thorium legacy waste determined to be hazardous under RCRA will be prepared and shipped for treatment to meet land disposal restrictions, and upon analytical confirmation, will be shipped from the treatment facility to an approved disposal facility.
- Non-RCRA thorium waste that contains free liquids and hydrogen-generating waste will require treatment and repackaging to meet Nevada Test Site waste acceptance criteria and will then be shipped to the Nevada Test Site for disposal.

The treatment activities for thorium legacy waste are planned for completion by December 31, 2002.

Mixed Waste Treatment

The FEMP stores mixed wastes that are subject to RCRA land disposal restrictions. These restrictions currently prohibit the storage of certain hazardous waste streams for longer than one year, unless OEPA approves an extension.

The 1992 amendment to RCRA, the Federal Facility Compliance Act, provided DOE with an exemption from enforcement under the land disposal restrictions storage prohibition as long as DOE sites complied with the plans and schedules for mixed waste treatment. This is identified in the Site Treatment Plan and the implementing Director's Findings and Orders issued by OEPA on October 4, 1995. The FEMP submitted the first Site Treatment Plan Annual Update to OEPA in December 1996. These updates are due by December 31 of each year. Since then, five additional annual updates have been submitted. The annual update describes the status of mixed waste treatment projects developed under the Site Treatment Plan. It also adds newly generated/newly identified mixed waste streams, and certifies that the FEMP met all regulatory milestone dates for the treatment of mixed wastes identified in the plan and in the implementing Director's Findings and Orders.

Mixed waste is defined under RCRA as waste containing both a hazardous waste subject to RCRA, and a source, special nuclear, or radioactive byproduct material subject to the Atomic Energy Act, as amended. RCRA mixed wastes at the FEMP are stored in consolidation tanks until they are shipped to the incinerator at Oak Ridge, Tennessee. The consolidation tanks at the FEMP hold approximately 20,000 gallons of material, which constitutes a "batch". Batches may contain oils, solvents or a combination of the two.

In 2001, 1,706 gallons (6,458 liters) of liquid mixed waste were bulked into batch 11 storage tanks, and 18,550 gallons (70,212 liters) of liquid mixed waste were bulked into batch 12 storage tanks. The following mixed wastes were shipped during 2001:

- 14,017 gallons (53,054 liters) of liquid mixed waste from batch 10 were shipped to the K-25 Toxic Substances Control Act Incinerator in Oak Ridge, Tennessee.
- 2,034 ft³ (58 m³) below-treatment-standard mixed waste were shipped to Envirocare of Utah, Inc. for disposal.
- 904 ft³ (26 m³) of First Article Test waste under the Organic Treatment Project were shipped to Materials & Energy Corporation in Oak Ridge, Tennessee under the DOE Broad Spectrum Contract.
- 2,239 ft³ (63 m³; under specific Waste Generator Services treatment campaigns) of liquid aqueous low level radioactive and mixed wastes meeting National Pollutant Discharge Elimination System (NPDES) Permit requirements were treated at the advanced wastewater treatment facility.

The following hazardous/recyclable wastes were shipped to approved recycle centers and/or treatment facilities in 2001:

- 576 ft³ (16 m³) of lead acid batteries
- 854 ft³ (24 m³) of lab packs and non-bulk chemicals
- 560 ft³ (16 m³) of electrical waste (fluorescent light tubes), 96 ft³ (3 m³) of electrical waste (ballasts), 24 ft³ (less than 1 m³) of electrical waste (Ni-cad batteries)
- 38 ft³ (1 m³) of photographic waste.

Clean Water Act

Under the Clean Water Act, as amended, the FEMP is governed by NPDES regulations that require the control of discharges of non-radiological pollutants to waters of the State of Ohio. The NPDES Permit, issued by the State of Ohio, specifies discharge and sample locations, sampling and reporting schedules, and discharge limitations. The FEMP submits monthly reports on NPDES activities to OEPA. The FEMP's current NPDES Permit, Permit No. 11O00004*FD, became effective on March 1, 2000. Chapter 4 discusses the surface water and treated effluent information in detail.

Clean Air Act

NESHAP Subpart H imposes a limit of 10 millirem (mrem) per year on the effective dose equivalent to the maximally exposed individual as a result of all air emissions (with the exception of radon) from the facility in a single year. For 2001 the FEMP was in compliance with the NESHAP dose limit, as determined by ambient air monitoring at the FEMP fenceline boundary.

EPA regulates the FEMP's radionuclide emission sources through NESHAP; OEPA has authority to enforce the State of Ohio's air standards including particulate, chemical, and toxic emission sources. In 2001 the FEMP complied with all emissions standards, as discussed in Chapter 5. The NESHAP Annual Report for 2001 is included as Appendix D.

Several remediation activities, including the waste pits remediation, decontamination and dismantling, soil excavation, and on-site disposal facility construction and waste placement, may result in the generation of fugitive dust, which is also regulated by OEPA. Compliance is accomplished by implementing the Fugitive Dust Control Policy negotiated between DOE and OEPA in 1997. This policy is implemented in the Best Available Technology Determination for Remedial Construction Activities on the Fernald Environmental Management Project (DOE 1997), the requirements of which are incorporated into each operable unit's remedial design and remedial action deliverables. The policy allows for visual observation of fugitive dust and implementation of dust control measures to determine compliance during remediation activities.

Superfund Amendments and Reauthorization Act of 1986

The Superfund Amendments and Reauthorization Act of 1986 (SARA) amended CERCLA and was enacted, in part, to clarify and expand CERCLA "Superfund" requirements. SARA Title III is also known as the Emergency Planning and Community Right-to-Know Act (EPCRA). SARA Title III, Section 312, Emergency and Hazardous Chemical Inventory Report (DOE 2001) for 2001 was submitted to OEPA and other local emergency planning/response organizations in February 2002. The report lists the amount and location of hazardous chemicals/substances stored or used in amounts greater than the minimum reporting threshold at any time during the previous year.

The SARA Title III, Section 313, Toxic Chemical Release Inventory Report will be submitted, as required, to OEPA and EPA before July 1, 2002. This report, called Form R, is required if the FEMP meets certain criteria and an applicable threshold for any SARA 313 chemical is reached.

The Toxic Chemical Release Inventory Report lists routine and accidental releases, as well as information about the activities, uses, and waste for each reported toxic chemical. During 2001 an evaluation began to determine if the FEMP has any chemicals that meet the SARA 313 manufactured, processed, or otherwise used reporting threshold requirements. The regulatory reporting threshold has changed for several chemicals; thus, a thorough review of chemicals at the FEMP will be conducted. The evaluation will be completed in June of 2002, and will be reported prior to the July 1, 2002 compliance date, as applicable. Should reporting criteria not be met, a letter to this effect will be forwarded to the appropriate agencies.

Any off-site release meeting or exceeding a reportable quantity as defined by SARA Title III, Section 304, requires immediate notifications to local emergency planning committees and the state emergency response commission. Depending on the respective requirements, notifications are also made to the National Response Center and to the appropriate federal, state, and local regulatory entities. All releases occurring at the FEMP are evaluated and documented to ensure that proper notifications are made in accordance with SARA. In addition to SARA, releases are also evaluated for notification under CERCLA Section 103, RCRA, the Toxic Substances Control Act, the Clean Air Act, the Clean Water Act, and Ohio environmental laws and regulations. In 2001 no releases occurred at the FEMP that required reporting to regulatory or other agencies, under any of the above regulations. Table 2-2 summarizes the FEMP's compliance with SARA Title III (i.e., EPCRA) reporting requirements during 2001.

TABLE 2-2
SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT, TITLE III
(EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT)
COMPLIANCE REPORTING, 2001^a

Sections of the Act	Yes	No	Not Required
302-303: Planning notification	X		
304: Extremely hazardous substances release notification			X
311-312: Material safety data sheet/chemical inventory	X		
313: Toxic chemical release inventory reporting (for calendar year 2000)	X		

^a"Yes" indicates that notifications were provided and/or reports were issued under the applicable provisions. "No" indicates that notifications or reports should have been provided but were not. "Not Required" indicates that no actions were required under the applicable provisions, either because triggering thresholds were not exceeded or no releases occurred.

Other Environmental Regulations

The FEMP is also required to comply with other environmental laws and regulations in addition to those described above. Table 2-3 summarizes compliance with each of these requirements for 2001.

Other Permits

Permits are the means by which some environmental laws are implemented. The FEMP has permits for controlled releases to surface water and air. The FEMP's permit for discharging water under the NPDES regulations is discussed in the Clean Water Act section of this chapter. The active Permits to Install remaining for the FEMP wastewater treatment system include those for the Storm Water Retention Basin and Bio-Surge Lagoon. Permits to Install govern the installation (and to a lesser degree, the operation) of specific wastewater treatment and control devices.

The FEMP has six current air Permits to Operate and three associated Permits to Install. These permits cover four boilers, a diesel storage tank, and a gasoline dispensing facility. EPA and OEPA approve other air emission sources and wastewater systems related to remedial activities through the review and approval of CERCLA remedial design packages or CERCLA-allowed permit information summaries.

TABLE 2-3

COMPLIANCE WITH OTHER ENVIRONMENTAL REGULATIONS

Regulation and Purpose	Background Compliance Issues	2001 Compliance Activities
Toxic Substances Control Act (TSCA)		
Regulates the manufacturing, use, storage, and disposal of toxic materials, including polychlorinated biphenyl (PCBs) and PCB items	The last routine TSCA inspection of the FEMP's program was conducted by EPA Region V on September 21, 1994. No violations of PCB regulations were identified during the inspection.	<p>Non-radiologically contaminated PCBs and PCB items are shipped to TSCA-approved commercial disposal facilities for incineration on an "as-needed basis".</p> <p>Radiologically contaminated PCB liquids were bulked for shipment to the TSCA permitted DOE incinerator in Oak Ridge, TN.</p> <p>Most radiologically contaminated PCB solids currently have no treatment or disposal options and remain in storage on site.</p>
Ohio Solid Waste Act		
Regulates infectious waste	The FEMP was registered with OEPA as a generator of infectious waste (generating more than 50 pounds [23 kg] per month) until December 6, 1999, when OEPA concurred with the FEMP's qualification as a small quantity generator.	All infectious wastes generated in the medical department were transported to a licensed treatment facility for incineration.
Federal Insecticide, Fungicide, and Rodenticide Act		
Regulates the registration, storage, labeling, and use of pesticides (such as insecticides, herbicides, and rodenticides)	The last inspection of the Federal Insecticide, Fungicide, and Rodenticide Act program conducted by EPA Region V on September 21, 1994, found the FEMP to be in full compliance with the requirements mandated by Federal Insecticide, Fungicide, and Rodenticide Act.	Pesticide applications at the FEMP were conducted according to Federal and State regulatory requirements.
National Environmental Policy Act (NEPA)		
Requires the evaluation of environmental socio-economic, and cultural impacts before any action, such as a construction or cleanup project, is initiated by a federal agency	An environmental assessment for proposed final land use was issued for public review in 1998. It was prepared under DOE's guidelines for implementation of NEPA, 10 Code of Federal Regulations 1021. It also addresses previous DOE commitments to consult with the public prior to any decisions on land use.	No NEPA activities were conducted in 2001.
Endangered Species Act		
Requires the protection of any threatened or endangered species found at the site as well as any critical habitat that is essential for the species' existence	Ecological surveys conducted by Miami University and DOE, in consultation with the Ohio Department of Natural Resources and U.S. Fish and Wildlife Service, have established the following list of threatened and endangered species and their habitats existing on site: Cave salamander, state-listed endangered - marginal habitat, none found; Sloan's crayfish, state-listed threatened - found on northern sections of Paddys Run; Indiana brown bat, federally listed endangered - species found in riparian areas along Paddys Run.	A survey of the site's state-threatened Sloan's crayfish population was conducted in 2001. As discussed in Chapter 7, this survey identified population levels consistent with previous surveys.

TABLE 2-3
(Continued)

Regulation and Purpose	Background Compliance Issues	2001 Compliance Activities
Floodplains/Wetlands Review Requirements		
DOE regulations require a floodplain/wetland assessment for DOE construction and improvement projects.	A wetlands delineation of the FEMP, completed in 1992 and approved by the U.S. Army Corps of Engineers in August 1993, identified 36 acres (15 hectares) of freshwater wetland on the FEMP property. Updated delineations are conducted approximately every five years.	No assessments were performed in 2001.
National Historic Preservation Act		
Mandates protection of historic and prehistoric cultural resources	The FEMP is within an area rich in historic and prehistoric cultural resources. These cultural resources include 148 prehistoric sites within 1.24 miles (2 km) of the FEMP and 40 historic sites.	Activities were conducted to avoid and address impacts to cultural resources (refer to Chapter 7).
Native American Graves Protection and Repatriation Act		
Requires the identification and preservation of cultural resources on federal lands, and consultation with Native American Tribes on removal and management of inadvertently discovered Native American cultural items	Historical remains and artifacts were discovered during a 1994 construction project. The Native American remains, which included an adolescent boy and his dog, were discovered during installation of pipelines for the Public Water Supply project. Partial remains of approximately 20 more people and numerous artifacts were also found.	No Native American remains were discovered or interred in 2001. Cultural resources were identified as a result of surveys performed (refer to Chapter 7).
National Resource Requirements Under CERCLA and Executive Order 12580		
Requires DOE to act as a Trustee (i.e., guardian) for natural resources at its federal facilities.	DOE and the other Trustees, which include U.S. Department of the Interior, U.S. Fish and Wildlife Service, OEPA, Ohio Attorney General's Office, and EPA, meet regularly to discuss potential impact to natural resources and to coordinate Trustee activities. The Trustees also interact with the Fernald Citizens Advisory Board and Community Reuse Organization.	The Trustees and stakeholders continued to discuss the scope of Natural Resource Restoration activities at the FEMP, and the integration of public use and long-term stewardship at the FEMP. In 2001, the Trustees agreed to and signed a Memorandum of Understanding.

Site-Specific Regulatory Agreements

Federal Facility Compliance Agreement

In July 1986 DOE entered into a Federal Facility Compliance Agreement (FFCA) with EPA, which requires the FEMP to:

- Maintain a continuous sample collection program for radiological constituents at the FEMP's treated effluent discharge points and report the results quarterly to EPA, OEPA, and the Ohio Department of Health. The sampling program to address this requirement has been modified over the years and is currently governed by an agreement reached with EPA and OEPA that became effective May 1, 1996. This agreement requires sampling at the Parshall Flume (PF 4001, the point where treated effluent leaves the FEMP) and the Storm Water Retention Basin spillway for radiological constituents. These data are reported through quarterly and annual reports (refer to Appendix B of this report) under the IEMP.
- Maintain a sampling program for daily flow and total uranium at the South Plume extraction wells and report the results quarterly to EPA, OEPA, and Ohio Department of Health. The sampling program conducted to address this requirement has also been modified over the years and is currently governed by the agreement reached with EPA and OEPA on May 1, 1996.

Federal Facility Agreement, Control and Abatement of Radon-222 Emissions

The Federal Facility Agreement (FFA) between DOE and EPA, signed in November of 1991, ensures that DOE takes all necessary actions to control and abate radon-222 emissions at the FEMP, under the authority of 40 Code of Federal Regulations 61, Subpart Q. This agreement acknowledges that Silos 1 and 2 exceed the radon flux rate of 20 picoCuries per square meter per second (pCi/m²/sec). But it allowed the FEMP to address this exceedance by implementing a removal action (installation of a bentonite cap in 1991) to bring radon emissions from the silos to a level as low as reasonably achievable (ALARA), and to attain the NESHAP Subpart Q standard upon completion of final remediation. The FFA also requires demonstration of compliance with the Subpart Q standard upon completion of remedial actions for the waste pits, clearwell, and any other sources found to contain radium-226 in sufficient concentrations to emit radon in excess of 20 pCi/m²/sec. Chapter 5 further discusses the results of the FEMP Radon Monitoring Program for 2001.

Split/Co-Located Sampling Program

In 2001 DOE and OEPA cooperated in a program in which samples of groundwater, surface water, and sediment, were "split" and sent to different analytical laboratories, or "co-located," meaning samples were collected from the same location but at different times. Split samples are obtained when technicians alternately add portions of a sample to two individual sample containers. This collection method helps ensure that both samples are as identical as possible. Split samples are then submitted to two independent laboratories for analysis. The FEMP has participated in this program with the state since 1987.

This program allows for an independent comparison of data to ascertain laboratory analysis and field quality assurance. The data from the split/co-located sampling program show reasonable agreement between DOE and OEPA results for groundwater, surface water, and sediment samples. The slight differences in DOE and OEPA sample results presented for 2001 do not impact the FEMP's compliance with federal or state regulations. The detailed results for the 2001 split/co-located samples are presented in Appendix E of this report.